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BUREAU OF STANDARDS
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Technical News Bulletin No. 63

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GENERAL NOTE

Owing to the current nature of the investigations mentioned in the Technical News Bulletin, sometimes it will be impossible to supply printed information regarding them. However, in these cases, when the investigation has progressed sufficiently far, the Bureau will be pleased to furnish technical data to those engaged in the particular application of the subject, in order to avoid the delay incident to publication.

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1 Improvements in Laboratory for Testing Dry Cells

The Bureau of Standards has a very complete laboratory for testing dry cells under all conditions encountered in service. The cells are discharged at various rates and for different periods of time and during test are subjected to a wide range of temperature, made possible by the installation of a special refrigerating plant and heating oven. The switches which govern the periods of discharge and recuperation for the batteries are controlled by a master relay operated by a clock. Heretofore only one clock has been employed and no difficulty has been experienced. However, as the apparatus has been used continuously for 2 1/2 years, it was evident that it would soon be necessary to stop the clock for cleaning and adjustment. When the equipment was installed, it was expected that this could be done whenever desirable, but the volume of work has been so great that it has been found necessary to operate the testing plant continuously. Therefore, a second clock has been installed with an automatic device which will throw over the control from one clock to the other in the event of stoppage of either. This places the Bureau's equipment on a very reliable plane, in line with similar apparatus used by the leading manufacturers.

2 Performance Tests for Radio Receiving Sets

Owing to the very large demand which has suddenly arisen for simple radio receiving sets, many retail dealers in other lines of work have taken up the handling of such equipment. It is very difficult for such dealers to decide whether sets offered by the manufacturers are of good or poor quality. The whole art is so new and some of the questions involved are so technical that the problem presents considerable difficulties.

As a consequence, the Department of Commerce, and particularly the Bureau of Standards, has received a great many requests for tests of such apparatus. As it is impossible for the Bureau to conduct all the work of this nature which it would be called upon to perform, it has drawn up rules covering performance test methods which are to be carried out by the Electrical Testing Laboratories of New York in cooperation with the National Retail Dry Goods Association, the latter body representing the retailers of radio receiving sets. As the work develops, suggestions regarding improvements of methods of testing will be subject to the approval of the Bureau of Standards.

The tests outlined include: Investigation as to the material and workmanship, the mechanical and electrical design, simplicity of adjustment, ruggedness, sensitivity, sharpness of tuning, wave length range and faithfulness of reproduction in radio telephone reception. The Investigating Committee of the National Retail Dry Goods Association has suggested that from a commercial standpoint it would be of assistance to their members if responsible manufacturers would plainly mark their equipment, indicating the receiving radius of each instrument under every atmospheric condition. Owing to the large number of factors which enter into the determination of the range over which signals can be received with a given set, this is a very difficult problem, impossible to solve at the present time by any brief statement or mark. Strength of signals required by a receiving operator, height and location of receiving antenna, power of transmitting station, its location with respect to other stations capable of causing interference as well as the sensitivity of the particular receiving set must all be considered.

3 Tests of Stellar Radiometers and Measurements of the Energy Distribution of the Spectra of 16 Stars

Additional tests supplementing and completing the series of measurements on the energy radiation of stars are described in Scientific Paper No. 438 of the Bureau of Standards, for sale by the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10¢ per copy.

The object of the investigation was to test new stellar thermocouples, to verify previous measurements of stellar radiation, to measure the radiation intensities of bright stars in the region of 0 hours to 12 hours in bright

ascension not previously measured, and to determine the feasibility of the method of obtaining the spectral energy distribution of stars by means of transmission screens which, either single or in combination, are placed in front of the vacuum thermocouple.

By means of vacuum thermocouples, measurements were made on the total radiation intensities of 13 bright stars not observed in 1914, thus completing the survey of the whole sky. A total of 30 celestial objects were measured including Venus and Mars. From a comparison of the observed and calculated spectral radiation components, it appears that what is known as the black body temperature, that is, the temperature which a black body would have to attain in order to emit a similar relative spectral energy distribution, varies from 3000°K for the red, Class M, through 6000°K for the yellow, solar type stars to 10 000°K, or perhaps even higher for the blue or Class B stars. Although the observing station used in the last measurements was much higher than the one previously employed, 7300 ft. as compared with 4000 ft., all data obtained verified previous measurements showing that red stars emit 3 to 4 times as much infra-red radiation as blue stars of the same magnitude.

4 Redetermination of Wave Lengths in Spectrum of an Iron Arc

As is now quite well known, the wave lengths of certain sources of light are being quite extensively employed as fundamental standards for length measurements. The International Astronomical Union meeting in Rome last year adopted a new type of iron arc as a source of secondary standards of wave length thus making it necessary to redetermine the wave lengths in this spectrum.

The required observations have, accordingly, been made at the Bureau of Standards by taking photographs of the interference fringes produced by cadmium, neon, and iron lines. About 50 spectrograms covering a wave length from 3000 to 9000A were obtained, and it is hoped that the observations will be reduced and compiled early in the fall.

It is gratifying to report that the International Astronomical Union has adopted practically all of the Bureau's work and suggestions concerning wave lengths. Additional information on this subject will be found in Bureau of Standards Scientific Papers Nos. 274, 327, 329, 414, and 441.

5 Carbon Monoxide in the Products of Combustion from Natural Gas Burners

Technologic Paper No. 212 of the Bureau of Standards, available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10¢ per copy, deals with the production of carbon monoxide by natural gas burners under unfavorable conditions of combustion and ventilation.

Carbon monoxide is a very poisonous gas and is produced in combustion processes where there is a deficiency of oxygen for completely burning the carbon in the gas to carbon dioxide. Conditions favorable to the production of carbon monoxide result with the usual type of gas burner when the flame receives insufficient air, or when the burner is placed too close to the utensil.

The maximum percentage of carbon monoxide in air allowable for continuous exposure from a hygienic standpoint should not be greater than 0.02%, and for intermittent exposures of one hour not greater than 0.04%. As it is known that the efficiency of natural gas burners can be slightly increased by placing the burner close to the utensil, it is important to know how close the burner can be placed without producing dangerous quantities of carbon monoxide. As the result of very extensive tests conducted in the Bureau's laboratories, it was found that the maximum quantity of carbon monoxide produced was 0.25 cu. ft. per hour.

Taking for comparison a room of 1000 cu. ft. capacity, which can be considered as representative of the size of the average kitchen, and taking 0.04% as the maximum limit of carbon monoxide permissible for healthful conditions, for 1 hour's exposure, it would take over 1 1/2 hours before the concentration reached the above percentage if only one burner was operated and the room was unventilated. However, if as many as 4 burners were used under the same conditions at one time, the carbon monoxide would increase to 0.04% in less than an hour.

It was observed that no carbon monoxide was found when the distance of the utensil from the burner was such that the blue inner cone of the flame did not reach the utensil. Just what this safe distance is depends upon the design of the burner and the air-to-gas ratio. It would appear that a great deal of the carbon monoxide is produced by the smothering of the flame by the products of combustion when these are hindered in their escape by the unavoidable baffling of the supply of secondary air.

Ventilation is, of course, essential where gas is consumed, and air which contains a deficiency of oxygen will smother the flame and result in the production of dangerous quantities of carbon monoxide. But under the worst conditions of top-burner operation, the amount of carbon monoxide liberated by the 5 different burners tested was not enough to be dangerous to health unless several burners were in use at the same time for several hours, or unless the room was unventilated.

In conclusion, when the natural ventilation which takes place through windows and doors of any room is considered, it would seem that the danger from carbon monoxide poisoning with natural gas burners is quite remote.

6 Tests of Gas Burners

Recently the Bureau of Standards has investigated several designs of burners for gas stoves and other domestic appliances which have been submitted by manufacturers. It has been noticed in some cases that in designing these appliances the fundamental principles upon which the correct functioning of a burner depends are disregarded. Thus, in one particular case of a burner for a natural gas range, the injector was so designed that it would be impossible with ordinary gas pressures to secure sufficient primary air. This is essential for a good flame, and unless it is properly provided for blackening of the cooking utensils is sure to result.

In another case of a burner for a house heating furnace, the flame was unevenly distributed throughout the length of the burner. In all cases, the Bureau endeavors to submit to the manufacturers recommendations for improving their appliances, and so far such criticisms and recommendations have been very well received.

7 Radiators for Aircraft Engines

In Technologic Paper No. 211 of the Bureau of Standards, available for sale by the Superintendent of Documents, Government Printing Office, Washington, D. C., at 50¢ per copy, there is communicated a great deal of material which it is hoped will prove of value to the automotive industry as well as to physicists and engineers generally.

The paper describes the laboratory investigations relating to aircraft engine radiators which were conducted by the Bureau during the World War and in the 2 years immediately succeeding it. Individual reports covering many phases of the subject have been published previously by the National Advisory Committee for Aeronautics and in scientific and engineering journals. These reports, however, lack the systematic coordination, uniform terminology, and unified mathematical treatment which should characterize a handbook on the subject. Moreover, the problems which were investigated first because of their greater importance and which were the subjects of the earliest reports are for that reason not so well covered as is now possible because the later work has thrown much additional light upon matters not settled at the time of the publication of the earlier reports.

Accordingly, the present paper is much more than a reprint and is in fact a revision and recompilation of the material available. The special investigations reported include: Development of the methods of measuring air flow

in radiator tubes, experiments upon the effect of the nature of surface upon air flow and upon heat dissipation from the surface of metal tubes to a high velocity air-stream, experiments to ascertain the degree of turbulence in the air tubes of a radiator core, and the mapping of the temperature distribution axially and transversely in the air tubes of radiator cores.

In addition to recording these special investigations, the paper contains a full description of laboratory methods and instruments and descriptions of the physical properties and geometrical characteristics of the various cores tested. Performance characteristics of 66 types of core are given in graphical form and empirical equations for relating the heat dissipating power of a radiator to the air flow through the core, for computing the performance of a core of any depth from that of a core of exactly similar construction but different depth, and for computing heat dissipating power of such cores from their geometrical dimensions, are included.

The effectiveness of indirect cooling surface, that is, cooling surface not backed by flowing water is developed mathematically, reduced to a practical working equation, and applied to computation of the best fin dimensions for given conditions. Also, the equations of thermal conductivity are applied in order to produce a table showing temperature drop through metallic water tubes of radiators having various wall thicknesses of different kinds of material.

The effect upon heat dissipation of varying rate of water flow is considered in detail, also a comparison of different methods of testing radiator cores calorimetrically, and a great many other topics having to do with the performance of the radiator in different positions and at different altitudes are discussed.

8 Investigation of Automobile Tail Lights

In cooperation with the various states, the Bureau of Standards is investigating the proper illumination of registration plates on automobiles and the efficiency of various forms of tail lights.

This is an important matter, since the general subject of the color, position, etc., of tail lights is now receiving considerable attention throughout the country. The Bureau is also engaged on work covering automobile headlights with the idea of aiding in the unification of state laws governing these appliances.

9 Code for Colors of Traffic Signals

Recently the Bureau of Standards has assisted in the preparation of numerous safety codes. At a special meeting of the American Engineering Standards Committee, it was recommended that the Bureau of Standards, together with the National Safety Council, should act as sponsors for a code

governing colors of street traffic signals. The recommendation was adopted, and the Bureau has accepted the invitation to act as sponsor.

10 Reclamation of Used Lubricating Oil

The investigation which the Bureau has been conducting on the reclamation of lubricating oils has been previously mentioned. In the last number of the Bulletin, it was stated that although an increase in the quantity of oil had been secured by a change in the process, it was feared this had been done at the sacrifice of quality. Further work during the past month has proved that this is the case since the last oil run out of the purifier contains too much sediment. However, there is little loss in stopping the flow of oil sooner because the last oil from the top of the sludge can be run to the dirty oil tank and then passed through the purifier again with the next batch of used oil.

11 Tests of Tires and Tubes for the Federal Purchasing Board

The report of the results of tests of tires and tubes submitted by the Subcommittee on Tires, Federal Purchasing Board, has been completed. All government departments will base their purchases for the next fiscal year on the recommendations made in this report.

12 Cooperative Investigation of Kitchen Ware Enamels

During the past month, the work of the enameled metals section of the Bureau has been practically confined to the investigation of kitchen ware enamels in cooperation with a representative of one of the manufacturing companies. About 10 ground coats have been applied to 8-inch steel dinner plates and coated with each of 7 cover enamels, representatives of a series of enamels varying in composition. Some 600 plates have been enameled during the month. They are now being tested for resistance to impact, to thermal shock, and to acids, but the work has not yet progressed to a point where conclusions can be drawn.

Some very interesting information, however, has been developed regarding the effect of variations in composition on the burning range, burning properties, and fish scaling. In connection with the latter, it is interesting to note that the results confirm the Bureau's conclusions from previous investigations of fish scaling and will be added proof as to the correctness of the theory.

Some of the results of this work will be checked on a factory basis at one of the manufacturing plants during the coming month after which the representative of this firm will return to the Bureau for further study. In the meantime, the testing of ware will be continued in the Bureau's laboratory.

13 Wear of Metals

Experimental work has been started in the study of the rate of or resistance to wear of steels when run in contact and without lubrication of any sort. The Amsler wear testing machine is being used for this investigation. The steels included in the preliminary studies form a series that has been submitted by the Gage Steel Committee and which is being studied in detail to determine the suitability of the steels for gages. In gage work, the question of wear is of extreme importance.

14 The Mechanical Working of Invar

Invar steel is very difficult to work mechanically but is an important alloy for certain classes of work where very low coefficient of expansion is desired. In order to see whether it could not be worked successfully, 4 small ingots of invar were prepared by the Metallurgical Division of the Bureau. The first attempt at forging was unsuccessful, the ingot cracking and breaking under the forging press. The second attempt was quite satisfactory as a result of very careful handling during forging operations.

It was found necessary to give very light reductions and not allow the forging temperature to drop below 1000°C during the first reduction. This ingot was forged to a 3/8" rod, and a portion of this was cut off and machined to a 1/4" rod. This has been cold drawn with 2 intermediate annealings down to approximately 1/16" wire. It is being carried further with the idea of determining how fine a wire of invar may be made.

15 Compression Tests of Forging Steel at High Temperatures

A series of compression tests at temperatures between 20 and 700°C on carbon forging steels has been completed. In this series the proportional limit decreased slightly with rise in temperature to 300°C and thereafter more rapidly to a very low value at 700°C. The yield point which was determined by means of the drop of the beam of the testing machine was first increased and then decreased.

16 The Effect of Manganese on the Magnetic Properties of Steel

It has been recognized for some time that manganese has an effect on the magnetic properties of steel which is of a somewhat similar nature to that of carbon. A series of iron-carbon-manganese alloys of exceptional purity have become available for a study of their magnetic properties. Several sets of specimens, each set having the same carbon content, but varying manganese, will be subjected to standard heat treatment and their magnetic properties determined. New apparatus for the testing of small specimens recently developed at the Bureau is being used in this investigation.

17 New Method for the Revising of Copper Map Plates

During the past few months, the Bureau has aided in experiments made at the Coast and Geodetic Survey and the Hydrographic Office dealing with a new method for revising copper map plates. These engraved plates are quite costly and when a few changes are to be made upon them the expense is considerable. The method most commonly used heretofore has been to make an electrolytic alto of the plate and then to scrape from the alto those parts to be altered and to make by deposition a basso from the altered alto. The corrections were then engraved in the basso thus produced.

The method proposed by a member of the Bureau of Standards and which has been found to yield satisfactory results depends upon the deposition of metal by a projection of the electrolyte. This process was discovered a few years ago by the above-mentioned member of the Bureau's staff and it appears to be very successful for this particular work.

In brief, the process consists in directing a stream of the electrolyte, in this case a copper oxide solution, against the metal surface in such a way that a current passes from the anode contained in the projecting apparatus to the metal plate which forms the cathode. The metal then deposits only upon those points at which the stream of liquid is directed and not over the rest of the plate even though the stream of solution may subsequently flow over it.

In applying this process to the correction of the copper plate, it was found desirable to first remove the engraved parts to be altered as it was difficult to cause the metal to deposit in the bottom of sharp lines. This removal has been accomplished by using the same apparatus with a reversed current whereby the copper from the particular spot is dissolved to any desired depth, after which the current is made to flow in the usual direction, whereupon copper is deposited over the surface in a dense adherent form which can be readily polished to a smooth surface and engraved.

The results so far obtained by this method are very promising, and the Coast and Geodetic Survey is now engaged in securing the necessary equipment, which is comparatively inexpensive, so that the process can be used in its regular work.

18 Method for Taking Finger Prints

The Postal Savings Branch of the Post Office Department uses a system of finger printing as a means of identification of depositors. There are objections to inking the fingers, and the Department was considering the purchase of special equipment which would cost a great deal in the aggregate. The Bureau of Standards was asked to study the problem and after some experimental work a method which appears to be satisfactory was devised. A request has been received for 12 sets of the equipment for trial in different Post Offices. The fingers are first coated by

pressing them upon a sheet of heavy paper impregnated with mineral oil, prints are then made on the necessary documents developed by dusting them with lampblack and fixed by spraying them with a dilute solution of shellac.

The improvement suggested by the Bureau is to do away with a camels hair pencil for applying the black and use instead a small ball of absorbent cotton coated with lampblack or gas black and tied up in a cover of organdy. When the oily prints, at first practically invisible, are dabbed with this, enough black comes through the organdy to make them visible and to develop their characteristics. The slight excess of black is blown away, and the prints are then fixed by spraying them with a shellac solution from an atomizer.

19 Protection of Eyes of Industrial Workers

A member of the Bureau's staff has been appointed one of the directors of the Eyesight Conservation Council, and while in New York recently conferred with the Managing Director concerning activities which will help to protect the eyes of industrial workers and secure the wider adoption and use of the Head and Eye Safety Code which was prepared a short time ago and in the preparation of which the Bureau cooperated.

20 New Publications on Paints

The second editions of Circular 90, "United States Government Specification for Red Lead, Dry and Paste," and Circular 97, "United States Government Specification for Green Paint, Semipaste and Ready Mixed," became available for distribution on June 19. It should be noted that the titles have been changed from the first editions, that is, they now read "United States Government Specification" instead of "Recommended Specification." Circulars 82, 84, 85, 87, 88, 89, 91, 93, 94, 111, and 117 have been ordered printed as revised with similar changes in title. All of these publications may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C.

21 Sewer Pipe Investigation

As previously mentioned in the Technical News Bulletin, the Bureau of Standards has undertaken an investigation of the condition of sewer pipes in the city of Los Angeles for the purpose of studying the effects of sewage and sewer gases on clay and cement pipes, both of which are now being extensively used in that city.

In this work the Bureau is cooperating with the clay and cement pipe manufacturers and the office of the City Engineer. The program for the investigation involves the excavation and inspection of sections of pipe from laterals in various parts of the city, and the replacement of these with tested pipe for future examination.

The major part of the work, however, consists in the installation of small sections of pipe in manholes in such a manner that a part of the specimens will be submerged in the

sewage and a part exposed only to the action of the sewer gases. The points at which exposure has been made have been selected in such manner as to cover typical conditions throughout the system, and at these points periodic analyses of the sewage and gases will be made to determine the concentration of ingredients which may be injurious to the pipes.

The object of the investigation is to determine by chemical survey, as outlined above, general relations between rate or extent of deterioration of pipes and concentration of damaging elements in the sewage and gases. The problem is a difficult one, not only on account of the extent of the work involved, but more particularly because the field which it enters is as yet unexplored.

22 Meeting of Committee on Bituminous Coatings

A representative of the Chemistry Division of the Bureau attended the meeting held in New York of the Committee on Bituminous Coatings, of the American Concrete Institute. The subject of dampproofing was covered thoroughly and tentative specifications for the various materials used for this purpose, together with their methods of application and use, were prepared. While in New York, a number of bituminous roofs surfacedwith promenade tile were inspected, and their methods of laying investigated in order to obtain information on which to base the preparation of specifications for promenade tile roofing for the Federal Sepcifications Board.

23 Curling of Asphalt Shingles

The curling of asphalt shingles used for roofs is a difficulty sometimes encountered, and the Bureau was recently requested by the Federal Trade Commission to investigate the subject. During a recent trip to New York, one of the Bureau's representatives discussed this subject with roofing manufacturers, and it was found that their views agreed with those of the Bureau; that curling is caused by insufficient saturation of the felt, saturation with a saturant containing large quantities of volatile material, and to improper laying.

It is claimed that curling can be avoided by using at least 140% of saturant and applying a thin coating of asphalt to the back of the shingle.

24 Strength Specifications for Scales

In the design of scales, strength and stiffness are important requirements. In the past, the nominal capacities usually associated with a given design of scale have borne little or no relation to the actual weighing capacities. Through the activities of the Bureau of Standards and its insistence that there be a reasonable and proper relation between the strength of a scale and its normal capacity; and on account of its pronounced position that the capacity of a scale should be based upon sound engineering principles, much improvement has been made in the last 10 years. Many

scales now have a nominal capacity corresponding to the actual weighing where this was not the case before. A great deal of progress, however, yet remains to be made.

The working stresses which should form the basis of scale design have been difficult to determine in all cases. In scales, cast iron is employed in transverse bending, representing circumstances unusual in other structural forms, where cast iron is not commonly so employed. This subject of working stresses has been receiving very careful study for many years. In its participation with a railroad committee representing the American Railway Engineering Association, the Bureau of Standards has been cooperating in establishing rational principles in the design and use of scales. A few months ago at the suggestion of the Bureau's represenrative, a decision on the matter of working stresses was postponed pending further study, and a series of tests were arranged for. In accordance with plans agreed upon, levers and test specimens were prepared. These have been recently broken in testing machines where the work was superintended by the Bureau's represenative and witnessed by members of the committee and representatives of manufacturers. The tests proved very satisfactory. The work was conducted with unusual dispatch on account of the facilities afforded and assistance extended by the Pennsylvania Railroad for the purpose.

The resulting data are now being carefully worked up and studied, and it is probable that this work will establish the working stresses adopted for scale design and thereby influence the capacity rating of all weighing scales of moderate and large capacity, in use throughout the United States.

25 Wood Screw Conference

On June 20, a second conference of wood screw manufacturers was held at the Bureau of Standards. Twelve of the largest wood screw manufacturers were represented. A new list of standard sizes was adopted which reduces the sizes of both steel and brass screws from 555 to 291, a reduction of 47%. The previous standards for tolerance in lengths of round head screws were revised.

Specifications for wood screws have been written as an outcome of the above conference and are now under consideration by the Hardware Committee of the Federal Specifications Board, It is expected that these specifications will be published very shortly as a Government standard.

26 Specifications for Various Classes of Rubber Goods

A meeting of the Subcommittee on Rubber Hose and two meetings of the Subcommittee on Fire Hose of the General Supply Committee of the Government were attended by a representative of the Bureau. Tests conducted in the rubber laboratories of the Bureau of Standards which are used as a basis for awards were explained to other members of the committee.

The result of the Bureau's work has apparently been highly satisfactory and will result in a considerable saving through the information available on which to base government purchases.

Two meetings of the Rubber Technical Committee, Federal Specifications Board, have been held during the past month and 12 specifications for hose are ready for report to the Committee on Rubber Goods of the Board.

One meeting of the Committee on Packings of the Federal Specifications Board has been held, and the outline of the work to be carried out in the laboratories has been discussed.

27 Standardization of Hosiery

At the annual conference of the National Association of Hosiery and Underwear Manufacturers, held during the latter part of May, the Bureau of Standards presented 6 projects in connection with which it considers that it can be of service to the industry. These are (1) the development of a standard form of contract for the purchase of yarns used in the manufacture of hosiery; (2) standard method for measuring the sizes of hosiery; (3) correction of mill practice of knitting to actual half sizes, suggests knitting 3 and boarding 6; (4) the development of tests and testing methods; (5) the standardization of specifications for hosiery purchased by the government, and (6) the standardization of nomenclature.

The Association has selected committees to work on these projects, and it is planned that a research associate will be sent to the Bureau to investigate special problems.

28 Standardization of Numbered Duck

The specifications which have been prepared for this material have been tentatively approved by manufacturers of numbered duck at their New York meeting held on June 14. The Cotton Duck Association appears to be well satisfied with the work which the Bureau has done on this material and proposes to ask its assistance in connection with other types of duck. The Association also proposes to have the standards, especially those applied to test methods, adopted throughout the country for other materials.

29 Standardization of Cordage

A joint meeting of the three committees which have been working on the standardization of cordage was held in New York on May 26. These committees, as previously described in the Bulletin, deal with the development of laboratory tests, service tests, and the standardization of nomenclature. A complete description of 8 types of machines to develop an endurance test for rope was submitted and discussed and plans for further work outlined. In connection with nomenclature, a large number of words were defined from the practical and laboratory points of view.

30 Conference in Connection with Specification and Standardization of Paper

A representative of the Bureau attended 2 meetings of the Committee on Paper Specifications appointed by the Joint Committee on Printing. The specifications for paper for use by the Government Printing Office were left unchanged for the next 6 months' contract, but in view of this fact it was thought desirable by the Chairman of the Specification Committee to ask the various contractors and paper manufacturers to meet with the committee next fall to discuss the specifications.

The report of the Bureau to the Joint Committee on Printing as to the effect of the relative humidity on paper was not acted upon by the Specifications Committee because of lack of agreement with the findings of the 2 technical members of the committee and the whole matter will be carried over until the proposed conference with the manufacturers and contractors next fall.

31 Specifications for Plate and Window Glass

The fourth conference of the committee on Specifications for Plate and Window Glass was held on June 15 at which time specifications for window glass were discussed in considerable detail. Two sets of suggested specifications were presented to the conference as a substitute for the tentative specification already prepared. These were considered of too general a nature to be acceptable in the form offered. The meeting brought out the general objection on the part of manufacturers to the writing of specifications with any definitely defined limitations. Plate glass specifications were discussed in the same manner, and the conclusion reached was that a new attempt ought to be made to define limits of quality which will conform more closely to actual methods of inspection. When this work is completed, another meeting will be called.

32 Specifications for Milk Bottles

At the recent Weights and Measures Conferece, the American Bottle Manufacturers sent a delegation for the purpose of aiding in any movement for the unification of state and municipal laws regarding the marking, capacity, position of filling mark, etc., of milk bottles. This resulted in the conference passing a resolution to the effect that this would be extremely desirable. Active progress in the accomplishment of these objects is under way and a conference took place on June 26 between all the interested dairy organizations and food and drug organizations.

In the afternoon session the group met with the Division of Simplified Practice for the purpose of reducing the number of sizes and shapes of filling caps.

PUBLICATIONS OF THE BUREAU OF STANDARDS RELEASED DURING JUNE.

Scientific Papers

S 433 Thermal Expansion of a Few Steels. Wilmer Souder and Peter Hidnert 5¢

S 435 Metallographic Etching Reagents. II. For Copper Alloys, Nickel, and the Alpha Alloys of Nickel. Henry S. Rawdon and Marjorie G. Lorentz 15¢

S 436 Interference Methods for Standardizing and Testing Precision Gage Blocks. C. G. Peters and H. S. Boyd 10¢

S 437 The Solubility of Dextrose in Water. Richard F. Jackson and Clara Gillis Silsbee 5¢

Technologic Papers

T 210 The Redwood Viscometer. Winslow H. Herschel 10¢

T 213 Power Losses in Automobile Tires. W. L. Holt and P. L. Wormeley 5¢

T 214 Durability of Cement Drain Tile and Concrete in Alkali Soils: Third Progress Report (1919-20). G. M. Williams 10¢

These publications may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the prices given above.

Respectfully,

S. W. STRATTON

Director

HGB